

CLAIMS

1. (currently amended) A method for pre-distorting an input signal, comprising:
generating, based on the input signal, a first signal corresponding to a first portion of a first transfer function, wherein the first portion of the first transfer function corresponds to a first voltage range of the input signal;
generating, based on the input signal, a second signal corresponding to a second portion of the first transfer function, wherein the second portion of the first transfer function corresponds to a second voltage range of the input signal different from the first voltage range of the input signal;
combining the first and second signals to generate a first combined signal corresponding to the first transfer function; and
pre-distorting the input signal based on the first combined signal.

2. (original) The invention of claim 1, wherein:
the first transfer function corresponds to amplitude characteristics of an amplifier; and
the amplitude of the input signal is adjusted based on the first combined signal.

3. (original) The invention of claim 1, wherein:
the first transfer function corresponds to phase characteristics of an amplifier; and
the phase of the input signal is adjusted based on the first combined signal.

4. (original) The invention of claim 3, further comprising:
generating, based on the input signal, a third signal corresponding to a first portion of a second transfer function corresponding to amplitude characteristics of the amplifier;
generating, based on the input signal, a fourth signal corresponding to a second portion of the second transfer function;
combining the third and fourth signals to generate a second combined signal corresponding to the second transfer function; and
adjusting the amplitude of the input signal based on the second combined signal.

5. (original) The invention of claim 4, further comprising detecting the envelope of the input signal, wherein:
the first and second signals are generated based on the envelope-detected input signal;
the first signal is generated by DC-shifting the envelope-detected input signal; and
the first and second signals are generated using different non-linear analog circuits that model different portions of the first transfer function.

6. (original) The invention of claim 1, further comprising detecting the envelope of the input signal, wherein the first and second signals are generated based on the envelope-detected input signal.

7. (original) The invention of claim 6, wherein the first signal is generated by DC-shifting the envelope-detected input signal.

8. (original) The invention of claim 1, wherein the first and second signals are generated using different non-linear analog circuits that model different portions of the first transfer function.

9. (original) The invention of claim 1, further comprising:
differentiating a first portion of the first combined signal to generate a differentiated signal; and

3 combining the differentiated signal with a second portion of the first combined signal to generate
4 a frequency-dependent combined signal, wherein the input signal is pre-distorted based on the frequency-
5 dependent combined signal.

1 10. (original) The invention of claim 1, further comprising:
2 generating a frequency-dependent pre-distortion signal; and
3 combining the frequency-dependent pre-distortion signal with the first combined signal to
4 generate a frequency-dependent combined signal, wherein the input signal is pre-distorted based on the
5 frequency-dependent combined signal.

1 11. (currently amended) An apparatus for pre-distorting an input signal, comprising:
2 means for generating, based on the input signal, a first signal corresponding to a first portion of a
3 first transfer function, wherein the first portion of the first transfer function corresponds to a first voltage
4 range of the input signal;
5 means for generating, based on the input signal, a second signal corresponding to a second
6 portion of the first transfer function, wherein the second portion of the first transfer function corresponds
7 to a second voltage range of the input signal different from the first voltage range of the input signal;
8 means for combining the first and second signals to generate a first combined signal
9 corresponding to the first transfer function; and
10 means for pre-distorting the input signal based on the first combined signal.

1 12. (original) The invention of claim 11, wherein:
2 the first transfer function corresponds to amplitude characteristics of an amplifier; and
3 the amplitude of the input signal is adjusted based on the first combined signal.

1 13. (original) The invention of claim 11, wherein:
2 the first transfer function corresponds to phase characteristics of an amplifier; and
3 the phase of the input signal is adjusted based on the first combined signal.

1 14. (original) The invention of claim 13, further comprising:
2 means for generating, based on the input signal, a third signal corresponding to a first portion of
3 a second transfer function corresponding to amplitude characteristics of the amplifier;
4 means for generating, based on the input signal, a fourth signal corresponding to a second portion
5 of the second transfer function;
6 means for combining the third and fourth signals to generate a second combined signal
7 corresponding to the second transfer function; and
8 means for adjusting the amplitude of the input signal based on the second combined signal.

1 15. (original) An apparatus for pre-distorting an input signal, comprising:
2 a main signal path comprising a first element adapted to pre-distort the input signal based on a
3 first control signal; and
4 a control signal path adapted to generate the first control signal and comprising:
5 an envelope detector adapted to detect the envelope of the input signal;
6 a DC-level-shifting circuit adapted to DC-shift a first copy of the envelope-detected input
7 signal;
8 a first non-linear circuit adapted to generate, based on the DC-shifted, envelope-detected
9 input signal, a first signal corresponding to a first portion of a first transfer function;
10 a second non-linear circuit adapted to generate, based on a second copy of the envelope-
11 detected input signal, a second signal corresponding to a second portion of the first transfer function; and

12 a first combiner adapted to combine the first and second signals to generate a first
13 combined signal corresponding to the first transfer function, wherein the first control signal is based on
14 the first combined signal.

1 16. (original) The invention of claim 15, wherein:
2 the first transfer function corresponds to amplitude characteristics of an amplifier; and
3 the first element is an attenuator adapted to adjust the amplitude of the input signal based on the
4 first control signal.

1 17. (original) The invention of claim 15, wherein:
2 the first transfer function corresponds to phase characteristics of an amplifier; and
3 the first element is a phase adjuster adapted to adjust the phase of the input signal based on the
4 first control signal.

1 18. (original) The invention of claim 17, wherein:
2 the main signal path further comprises an attenuator adapted to adjust the amplitude of the input
3 signal based on a second control signal; and
4 the control signal path is further adapted to generate the second control signal and further
5 comprises:
6 a third non-linear circuit adapted to generate, based on the DC-shifted, envelope-detected
7 input signal, a third signal corresponding to a first portion of a second transfer function corresponding to
8 amplitude characteristics of the amplifier;
9 a fourth non-linear circuit adapted to generate, based on the envelope-detected input
10 signal, a fourth signal corresponding to a second portion of the second transfer function; and
11 a second combiner adapted to combine the third and fourth signals to generate a second
12 combined signal corresponding to the second transfer function, wherein the second control signal is
13 based on the second combined signal.

1 19. (original) The invention of claim 18, wherein the first and second non-linear circuits are
2 analog circuits.

1 20. (original) The invention of claim 15, wherein the first and second non-linear circuits are
2 analog circuits.

1 21. (original) The invention of claim 15, wherein the control signal path further comprises:
2 a differentiator adapted to differentiate a first portion of the first combined signal to generate a
3 differentiated signal; and
4 a second combiner adapted to combine the differentiated signal with a second portion of the first
5 combined signal to generate a frequency-dependent combined signal, wherein the first control signal is
6 based on the frequency-dependent combined signal.

1 22. (original) The invention of claim 15, further comprising:
2 an additional set of circuitry adapted to generate a frequency-dependent pre-distortion signal; and
3 a second combiner adapted to combine the frequency-dependent pre-distortion signal with the
4 first combined signal to generate a frequency-dependent combined signal, wherein the first control signal
5 is based on the frequency-dependent combined signal.

1 23. (new) A method for pre-distorting an input signal, comprising:
2 detecting the envelope of the input signal;

3 generating, by DC-shifting the envelope-detected input signal, a first signal corresponding to a
4 first portion of a first transfer function;
5 generating, based on the envelope-detected input signal, a second signal corresponding to a
6 second portion of the first transfer function;
7 combining the first and second signals to generate a first combined signal corresponding to the
8 first transfer function; and
9 pre-distorting the input signal based on the first combined signal.

1 24. (new) A method for pre-distorting an input signal, comprising:
2 generating, based on the input signal, a first signal corresponding to a first portion of a first
3 transfer function;
4 generating, based on the input signal, a second signal corresponding to a second portion of the
5 first transfer function;
6 combining the first and second signals to generate a first combined signal corresponding to the
7 first transfer function;
8 differentiating a first portion of the first combined signal to generate a differentiated signal;
9 combining the differentiated signal with a second portion of the first combined signal to generate
10 a frequency-dependent combined signal; and
11 pre-distorting the input signal based on the frequency-dependent combined signal.

1 25. (new) A method for pre-distorting an input signal, comprising:
2 generating, based on the input signal, a first signal corresponding to a first portion of a first
3 transfer function;
4 generating, based on the input signal, a second signal corresponding to a second portion of the
5 first transfer function;
6 combining the first and second signals to generate a first combined signal corresponding to the
7 first transfer function;
8 generating a frequency-dependent pre-distortion signal;
9 combining the frequency-dependent pre-distortion signal with the first combined signal to
10 generate a frequency-dependent combined signal; and
11 pre-distorting the input signal based on the frequency-dependent combined signal.